



**UNITED STATES DEPARTMENT OF COMMERCE  
Patent and Trademark Office**

Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231

SERIAL NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NO.
09/045,018	03/20/98	CHESNEY	C 120.010US1

QM41/0318

SCHWEGMAN LUNDBERG WOESSNER  
AND KLUTH  
P O BOX 2938  
MINNEAPOLIS MN 55402

EXAMINER	
NATNITHITHADHA, N	
ART UNIT	PAPER NUMBER
3736	2

DATE MAILED: 03/18/99

**Please find below a communication from the EXAMINER in charge of this application.**

Commissioner of Patents

# Office Action Summary

Application No.  
**09/045,018**

Applicant(s)  
**Chesney et al**

Examiner  
**Navin Natnithithadha**

Group Art Unit  
**3736**



☒ Responsive to communication(s) filed on Mar 20, 1998

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

## Disposition of Claims

☒ Claim(s) 1-20 is/are pending in the application.

Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 1-4, 9, 11, and 13-16 is/are rejected.

☒ Claim(s) 5-8, 10, 12, and 17-20 is/are objected to.

☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been  
☐ received.

☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

☒ Notice of References Cited, PTO-892 .

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). \_\_\_\_\_

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

### **Part III DETAILED ACTION**

1. Claims 1-20 are presented for examination.

#### ***Specification***

2. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

#### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2, 9, 13, 14, are rejected under 35 U.S.C. 102(b) as being anticipated by Shirley et al, U.S. Patent No. 4,784,154.

Shirley et al teaches the invention (claim 1) as claimed, including a body-sound sensor as an interference resistant transducer for monitoring the acoustic signals (e.g., see Abstract and see claim 11, lines 1-2), comprising:

- a) a housing and skin-contact diaphragm attached across a recess or opening in the housing taught as a housing adapted to receive a diaphragm assembly (e.g., see claim 11, line 3);
- b) a piezoelectric device having a first portion mounted in a fixed relationship to the housing and a second portion displacementally coupled to the diaphragm taught as a means for communicating an acoustic signal to the piezoelectric diaphragm to cause movement thereof, the piezoelectric diaphragm producing an electrical signal in response to the movement (e.g., see claim 11, lines 10-13);
- c) a solid-state amplifier having a signal input coupled to the device wherein the device and amplifier together have a frequency response at least including a range from below approximately 1 hertz to above approximately 250 hertz taught as a means for amplifying the differential output signal to provide an electrical representation of the acoustic signal (e.g., see claim 11, lines 32-34).

As to claim 2, Shirley et al teaches the housing and the skin-contact diaphragm are stainless steel (e.g., see col. 2, line 67 to col. 3, line 2).

As to claim 9, Shirley et al teaches constant current sources from the piezoelectric ceramic disc coupled to the amplifier (e.g., see Fig. 5a).

Shirley et al teaches the invention (claim 13) as claimed, including a method for sensing body sounds as an interference resistant transducer for monitoring the acoustic signals (e.g., see Abstract and see claim 11, lines 1-2), comprising the steps of:

a) displacing a skin-contact diaphragm using changing pressure at a skin surface to create a diaphragm displacement; converting the diaphragm displacement into a piezoelectric displacement; and generating an electrical signal representative of the piezoelectric displacement taught as a means for communicating an acoustic signal to the piezoelectric diaphragm to cause movement thereof, the piezoelectric diaphragm producing an electrical signal in response to the movement (e.g., see claim 11, lines 10-13);

b) amplifying the electrical signal, wherein the steps of displacing, converting, and amplifying together have a frequency response at least including a range from below approximately 1 hertz to above approximately 250 hertz taught as a means for amplifying the differential output signal to provide an electrical representation of the acoustic signal (e.g., see claim 11, lines 32-34).

As to claim 14, Shirley et al teaches the housing and the skin-contact diaphragm are stainless steel (e.g., see col. 2, line 67 to col. 3, line 2).

### *Claim Rejections - 35 USC § 103*

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 3, 4, 11, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shirley et al, U.S. Patent No. 4,784,154.

Claims 1 and 13 were rejected under 35 U.S.C. 102(b) as discussed above.

As to claims 3, 4, 15, and 16, Shirley et al does not specifically teach the dimensions of the skin-contact surface. However, the dimensions are a matter of engineering choice based upon the design parameters.

Shirley et al teaches the invention (claim 11) substantially as claimed, including a piezoelectric acoustical pressure sensor as an interference resistant transducer for monitoring the acoustic signals (e.g., see Abstract and see claim 11, lines 1-2), comprising:

a) a stainless-steel, the housing having a skin-contact diaphragm taught as a housing adapted to receive a diaphragm assembly (e.g., see claim 11, line 3 and see col. 2, line 67 to col. 3, line 2);

b) a piezoelectric device displacementally coupled to the diaphragm taught as a means for communicating an acoustic signal to the piezoelectric diaphragm to cause movement thereof, the piezoelectric diaphragm producing an electrical signal in response to the movement (e.g., see claim 11, lines 10-13);

c) a solid-state amplifier having a signal input coupled to the device, the device and amplifier together have a frequency response at least including a range from below approximately 1 hertz to above approximately 250 hertz taught as a means for amplifying the differential output

signal to provide an electrical representation of the acoustic signal (e.g., see claim 11, lines 32-34).

Shirley et al does not specifically teach the diaphragm having a skin-contact surface with a skin-contact dimension of between approximately 0.3 inch and 0.7 inch. However, the dimensions are a matter of engineering choice based upon the design parameters.

#### *Allowable Subject Matter*

7. Claims 5-8, 10, 12, 17-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### *Conclusion*

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 5,035,247 teaches a sensor for non-invasive measurement of sound, pressure, and vibration on the human body.

U.S. Patent No. 4,947,859 teaches a sound sensor apparatus for reception of bio-acoustic signals from the body of a patient.

U.S. Patent No. 4,672,976 teaches a heart sound sensing device for placement on the body of a patient and for detection of low frequency sound waves.

Serial Number: 09/045,018

7

Art Unit: 3736

---

U.S Patent No. 4,431,873 teaches a acoustic snensor with a piezoelectric cermaic disc attached to each face of a diaphragm.

U.S. Patent No. 3,651,353 teaches a piezoelectric pressure transducer.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emr. Navin Natnithithadha, whose telephone number is (703) 305-2445.

The examiner can normally be reached on M-TH from 8:00 a.m. to 5:00 p.m. EST.

If attempts to reach the examiner by phone fail, the examiner's supervisor, Cary E. O'Connor, can be reached at (703) 308-2701. Additionally, the fax phone for Art Unit 3736 is (703) 308-0758.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist at (703) 308-1148.

Navin Natnithithadha  
Patent Examiner  
Art Unit 3736  
March 10, 1999

*Robert L. Nasser*  
**ROBERT L. NASSER**  
**PRIMARY EXAMINER**  
**ROBERT L. NASSER**  
**PRIMARY EXAMINER**